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THE RHODE ISLAND SMOKEFREE PUBLIC PLACE AND WORKPLACE LAW: ESTIMATED IMPACT ON ASTHMA IN THE RHODE ISLAND WORKFORCE

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Two distinguishing features set health legislation apart from other public health interventions. First, health legislation has far reaching effects on population health by impacting large societal segments. Second, its impact is sustained for the life of the legislation. In contrast, one-on-one health interventions or small-scale health campaigns marked by definitive start and end points risk message loss within a message-inundated society.

Under recently enacted Rhode Island state law, workplaces are now smoke-free environments (Public Health & Safety Act of 2004 - Smokefree Public Place and Workplace Law, Chapter 23-20.10).[1] With few exceptions, employees are guaranteed a workplace environment free of the prolonged and harmful effects of **second-hand smoke (SHS)** exposure. The adverse effects of SHS include respiratory effects such as asthma, emphysema, and lung cancer, and cardiovascular effects such as heart attack and stroke. Seven states have enacted smoke-free workplace or public place smoke-free laws.[2]

SHS is known to trigger asthma symptoms, and is also clearly implicated in the initial development of asthma.[3] Research demonstrates that 8% of adult-onset asthma (asthma diagnosed at ages 18 and above) is attributed to SHS.[4] SHS workplace legislation has a dual public health benefit specific to individuals with asthma. First, it reduces the risk of asthma exacerbations for employees with asthma, thus expanding employment opportunities for those with asthma. Second, it has the potential to reduce the development of adult-onset asthma, including work-induced adult-onset asthma. Estimating the magnitude of these two public health benefits is the focus of this paper.

Asthma is a leading chronic disease in the United States, affecting 11% of adults 18 and older (2002), [5] including an estimated 13% of Rhode Island adults ages 18-64 who report ever having had asthma (diagnosed by a medical provider, i.e., "lifetime asthma"). A smaller group, slightly more than 8% of Rhode Islanders ages 18-64 in 2002, report having asthma at the present time (diagnosed by a medical provider, i.e., "current asthma").[5]

Estimates of adult-onset asthma attributed to the workplace vary greatly. Some studies attribute 10 to 15% of adult-onset asthma cases to workplace exposures, while others place the estimate between 2 and 26%.[6,7] Work-related asthma is classified as one of two types, *work-aggravated* asthma and *new-onset* or *work-induced* asthma.[7] Work-aggravated asthma is defined as previously-diagnosed asthma with an exacerbation of symptoms after exposure to substances in the workplace.[7] *New-onset asthma* is defined as newly-diagnosed asthma developed after exposures to substances in the workplace. "Newly diagnosed" is defined as "never diagnosed with asthma" or "previously diagnosed and symptom free for two years."[7] SHS exposure in the workplace is a potential cause of both *work-aggravated* asthma and *new-onset* or *work-induced* asthma.[4]

METHODS

The public health impact of the "Public Health & Safety Act of 2004" was assessed using data from the Rhode Island Behavioral **Risk Factor Surveillance System (BRFSS)** collected in calendar year 2002 and from statistics published by the United States Department of Labor, Bureau of Labor Statistics, for the year 2002. The BRFSS conducts a national telephone survey of randomly selected non-institutionalized adults (ages 18 and older) who live in households with telephones, monitoring the prevalence of behavioral risk factors for leading causes of disease and death. The 2002 BRFSS survey contained sufficient asthma-related questions to estimate asthma prevalence among Rhode Island adults, ages 18-64, traditionally the group of focus for workforce statistics in the United States. Data from the United States Bureau of Labor statistics were used to determine the number of individuals in the Rhode Island workforce.

RESULTS

Lifetime Asthma

In 2002, a total of 468,451 persons were employed in Rhode Island private industry and government combined.[8] In the same year, an estimated 13% of employed Rhode Island adults ages 18-64 reported lifetime asthma in response to BRFSS survey questions.[5] Therefore, an estimated 60,900 adults employed in Rhode Island in 2002 had lifetime asthma. (468,451 employed persons times 13% of employed adults ages 18-64 with lifetime asthma equals 60,899.)

Employed adults with lifetime asthma include persons diagnosed at ages younger than 18, and persons diagnosed at ages 18 and above (adult-onset). In Rhode Island, 45% of adults with lifetime asthma reported adult-onset.[5] Therefore, an estimated 27,400 employed Rhode Island adults

with lifetime asthma experienced the onset of asthma as adults. (60,900 employed Rhode Island adults with lifetime asthma times 45% of adults with lifetime asthma who reported adult asthma onset equals 27,411.)

On the basis of previous studies, about 15% of adult-onset asthma may be work-related. Therefore, 4,100 adults employed in Rhode Island may have developed work-related, adult-onset asthma, a portion of which is attributable to SHS (15% of 27,411 employed Rhode Island adults with adult-onset lifetime asthma).

Current Asthma

Similar logic was used to compute estimates for adults with current asthma: An estimated 38,880 adults employed in Rhode Island had current asthma in 2002. Of these 38,880, an estimated 19,440 developed asthma as adults, and of these 19,440, about 2,916 may have asthma related to asthma triggers in the workplace, including SHS.

Discussion

Rhode Island's Smokefree Public Place and Workplace Law guarantees legal protection from exposure to SHS in the workplace, thus protecting about 60,900 adult workers with lifetime asthma and 38,880 adult workers with current asthma.

SHS is one of many factors contributing to work-related asthma.[7] Thus, although the new workplace law will undoubtedly prevent many new cases of work-related adult-onset asthma, it will not eliminate *all* new cases. Nonetheless, every case prevented will preserve quality of life and lower health care costs, because asthma leads to days missed from work, ER visits and hospitalizations.[9] To illustrate, consider recent asthma data from Rhode Island's hospital discharge data set. In 2002, about $6,420,000 was expended on adults hospitalized for asthma (642 hospitalizations at an average cost of $10,000 per hospitalization). With the new smoke-free workplace law taking effect, this cost, as well as other costs of asthma morbidity, will probably decline.[4]

This analysis contains limitations. First, the estimates are not adjusted for existing workplaces prohibiting smoking; these data are not available. Such corrections would most likely generate lower estimates than presented here. Nonetheless, such legislation brings legal protection to an otherwise voluntary effort. Second, the workforce data contain data on all workforce members regardless of age. Although the preponderance of workers in Rhode Island are in the 18-64 age group, like the asthma prevalence estimated presented in this analysis. Some are undoubtedly older and younger. However, the prevalence of asthma is higher in younger age groups and lower in 65 and older age groups.

The Public Health & Safety Act of 2004 landmark legislation legally protects an estimated 60,899 employed Rhode Island adults with lifetime asthma and an estimated 38,881 employed Rhode Island adults with current asthma against exposure to workplace SHS.

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